

REMARKS / ARGUMENTS

For the convenience of the Examiner and clarity of purpose, Assignee has reprinted the substance of the Office Action in *10-point bolded and italicized font*. Assignee's arguments immediately follow in regular font.

3. Claims 1-13, 16-19, 21-23, 25-26, 28-30, and 32 are rejected under 35 U.S.C. 102(b) as being anticipated by Khrustalev et al. (US 2003/001 0477).

With respect to claim 1, Khrustalev et al. teaches a computer system comprising: a chassis (10), a first computer module compartment (Between elements 30, See Fig 3. See also paragraph 35) positioned in the chassis and in an air flow path (See Paragraph 42, where the airflow path to cool 36 could be upward) to which heat from the first compartment is transferred (As air is passed over the module in the compartment it will receive heat), a second computer module compartment (Between elements 30) positioned in the chassis and in the air flow path (See fig 1) an air-to-fluid heat exchanger (30) positioned in the chassis between the first and second compartments in the air flow path (See fig 1) and adapted to remove a portion of the heat therefrom (As air is passed through the heat exchanger (30) the hot air will transfer some of the heat from the air to the fluid in the exchanger).

7. Applicant's arguments filed 12/13/2006 have been fully considered but they are not persuasive.

With respect to the Applicants' remarks to claim 1 that, "The Office's rejection of claim 1 over Khrustalev focused on the condenser 36 as the claimed "heat exchanger"", the Examiner respectfully disagrees and notes that both the rejection above and the rejection in the office action dated 6/13/2006 explicitly designate the heat exchanger as element 30. Therefore it was never the Examiner's position that the heat exchanger be labeled element 30.

With respect to the Applicants' remarks to claim 1 that, "a person of ordinary skill in the art would not understand Khrustalev to disclose and teach "a heat exchanger positioned in the chassis and in the air flow path"", the Examiner respectfully disagrees. The Examiner first respectfully notes that the claim does not require that air be flowing in the path rather, that an airflow path is present. As presently understood in the art, an airflow path can be any path by which air is allowed to flow. Clearly air is allowed to flow upward through the chassis (10) and therefore Khrustalev teaches "an air flow path" as claimed. Further the Examiner notes that the forced air discussion present in the remarks to claim 1 is moot since the claims are broader than the present argument (i.e. the claims do not mention forced air).

With respect to the Applicants' remarks to claim 1 that, "Khrustalev does not

disclose 1) an air-to-fluid heat exchanger within the cabinet 10; 2) transferring heat to air within the cabinet to effect cooling; or 3) that the condenser 36 is positioned between a first and second module compartment" the Examiner respectfully disagrees. As disclosed in the rejection above Khurstalev clearly teaches an air-to-fluid heat exchanger (30) where fluid is present within the exchanger and accepts heat from the air). Further the Examiner notes that heat is transferred to the air-from the module via natural convection within the chassis and, when warmed air flows through a second heat exchanger (30) above the compartment, it will release the heat within the air to the fluid within the exchanger.

Assignee contends that claim 1, as presented before this amendment, is patentable over the art of record. However, to place claim 1 and its dependents in better condition for allowance or appeal, Assignee has chosen to amend Claim 1, without prejudice to re-presenting claim 1 in its original form. Amended claim 1 now explicitly requires:

a chassis having an air inlet and an air outlet;

an air mover associated with either the air inlet or the air outlet and establishing a forced air flow path within the chassis;

a first computer module compartment positioned in the chassis and in an the forced air flow path to which so that heat from the first compartment is transferred to the forced air flow;

a second computer module compartment positioned in the chassis and in the forced air flow path;

an air-to-fluid heat exchanger having a plurality of heat transfer surfaces therein, and positioned in the chassis between the first and second compartments in the forced air flow path such that the forced air flows through the heat exchanger and across the heat transfer surfaces and adapted to remove thereby removes a portion of the heat therefrom.

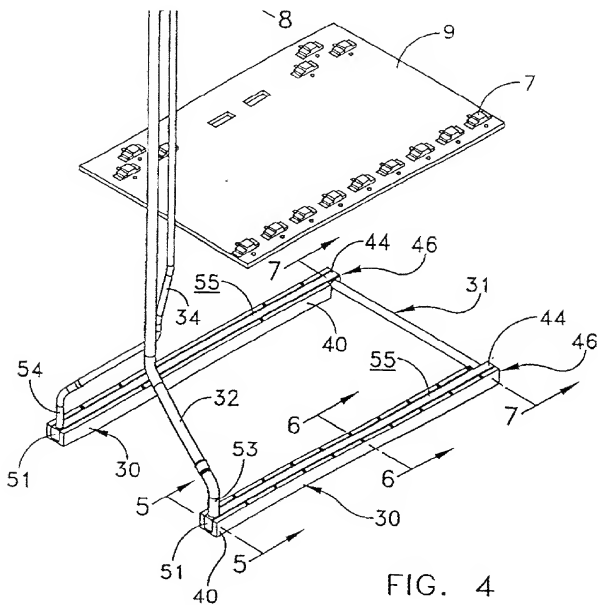
Assignee respectfully submits that claim 1 and its dependents are patentable over Khurstalev for at least the following reasons. First, the Office has effectively admitted that

Khrustalev does not disclose or teach a “forced air flow” within the cabinet as now explicitly required by claim 1.

Second, the only heat exchanger Khrustalev discloses within its cabinet 10 is “rail evaporator 30.” Assignee respectfully disagrees with the Office’s contention that Khrustalev’s “rail evaporator 30” is an “air-to-fluid heat exchanger.” Assignee submits that no one of ordinary skill in the art would understand Khrustalev’s rail evaporator 30 to be an “air-to-fluid heat exchanger.” Without “evidence” that Khrustalev’s rail evaporator is an air-to-fluid heat exchanger, the Office may not rely on such an assumption unless the asserted “fact” (i.e., that the rail evaporator is an air to fluid heat exchanger) is well-known, or is common knowledge in the art and is capable of instant and unquestionable demonstration as being well-known. As noted by the court in *In re Ahlert*, 424 F.2d 1088, 1091, 165 USPQ 418, 420 (CCPA 1970), the notice of facts beyond the record must be “capable of such instant and unquestionable demonstration as to defy dispute” (citing *In re Knapp Monarch Co.*, 296 F.2d 230, 132 USPQ 6 (CCPA 1961)). Assignee disputes the Office’s assumption that rail evaporator 30 is an air-to-fluid heat exchanger and requests the Office to produce evidence that it is well-known that Khrustalev’s rail evaporator is an air-to-fluid heat exchanger.

Khrustalev’s heat exchanger 30 is disclosed to be a “rail evaporator 30 including...a milled channel 42...and a tube 44 mounted within channel 42 compris[ing]...an exposed thermal interface surface 55.” See Khrustalev ¶¶ 37-38, FIGS. 4-7. Accordingly, heat exchange occurs via “conductive contact between thermal interface surface 55 and the bottom surface of circuit board 9.” See *id.* Therefore, as seen for example in a portion of Khrustalev’s FIG. 4, reproduced

below, Khrustalev's heat exchanger 30 accomplishes heat exchange through direct "contact between" circuit board 9 and surfaces 55, not through air-to-fluid heat exchange as required by claim 1



Furthermore, as seen in a portion of Khrustalev's FIG. 3 reproduced below, the only

surfaces through which heat is exchanged to fluid (surfaces 55) are substantially completely *insulated from surrounding air* by rail 40 and board 9.

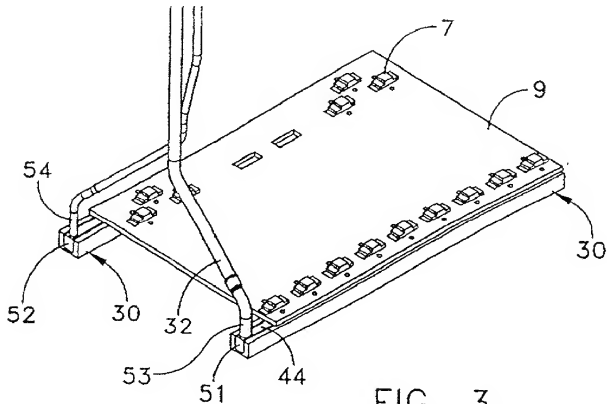


FIG. 3

It follows that even if air was forced to flow in the cabinet 10 (and Assignee contends that such is not disclosed by Khrustalev), any transfer of heat from the forced air would be minimal, if such transfer could occur at all. In fact, it is equally, if not more, likely that any exposed portion of Khrustalev's evaporator would transfer heat *to the air*. It follows that the Examiner's assumption that "the hot air will transfer some of the heat from the air to the fluid in the exchanger" is also without support in Khrustalev. The Office can point to no written disclosure that Khrustalev's evaporator 30 *removes heat from air*.

Assignee respectfully submits that, for at least these reasons, Khrustalev cannot anticipate original claim 1. Reconsideration and withdrawal of this rejection is earnestly requested.

With respect to claim 26, Khrustalev et al. further teaches a computer system comprising: a chassis (10), a first computer module compartment (Between respective heat exchangers (30) positioned in the chassis and in an air flow path (See Fig 1); a first air-to-liquid heat exchanger (30 - where the liquid within the exchanger absorbs heat from the air that passes through it) positioned in the chassis and in the air flow path (See Fig 1), wherein the first heat exchanger includes at least one internal fluid passage configured to carry a working fluid that 'absorbs heat from air flowing in the air flow path (See paragraph 39), and a second heat exchanger (12) positioned external to the chassis (See Fig 1) and in fluid communication with the first heat exchanger (Paragraph 35, "and to transport the collected thermal energy to an external heat sink 12" where the collected thermal energy is in the fluid and therefore the second heat exchanger is in fluid communication with the first heat exchanger), wherein the second heat exchanger is configured to cool the working fluid carried by the first heat exchanger (Upward airflow from either convection or forced air will cause transfer heat to the working fluid in the second, higher heat exchanger).

With respect to the Applicants' remarks to claim 26 that, "Khrustalev, does not disclose 1) an air-to-fluid heat exchanger within the cabinet", the Examiner respectfully directs the Applicant's to the response to the arguments of claim 1 above. With respect to the remarks that, "Khrustalev, does not disclose ... 2) an external heat exchanger in fluid communication with the first heat exchanger" the Examiner respectfully disagrees. As disclosed in Fig 1 and Paragraph 35, element 12 is clearly a second heat exchanger which is external to the chassis and in fluid communication with the first heat exchanger (See rejection above).

While Assignee does not accede to the stated rejection of claim 26 as presented before this amendment, Assignee has chosen to amend claim 26, without prejudice, to place it and its dependents in better condition for allowance or appeal. Claim 26 now explicitly requires:

a chassis;

an air mover coupled to the chassis to induce a flow of air along a flow path within

the chassis;

- a first computer module compartment positioned in the chassis and in ~~an~~ **the** air flow path;
- a first air-to-liquid heat exchanger positioned in the chassis and in the air flow path, wherein the first heat exchanger includes at least one internal fluid passage configured to carry a working fluid that absorbs heat from **air-flowing-in** the air flow path; and
- a second heat exchanger positioned external to the chassis and in fluid communication with the first heat exchanger, wherein the second heat exchanger is configured to cool the working fluid ~~carried by the first heat exchanger~~.

For at least the reasons set forth above with respect to claim 1, claim 26 and its dependents are patentable over Khrustalev. Reconsideration and withdrawal of this rejection is requested.

With respect to claim 2, Khrustalev et al. further teaches that the heat exchanger (30) is positioned at least partially downstream of the first computer module compartment and at least partially upstream of the second computer module compartment (See Fig 1).

With respect to claim 3, Khrustalev et al. further teaches that the heat exchanger (30) includes at least one internal fluid passage configured to carry a working fluid (See Paragraph 39).

With respect to claims 4 and 16, Khrustalev et al. further teaches that the heat exchanger (30) includes at least one internal fluid passage configured to carry a working fluid having a boiling point in the heat exchanger between about 45F and about 75F (See Paragraph 39. Additionally the Examiner notes that the language "configured to" or "adapted to" is not a positive limitation but only requires the ability to so perform, and therefore is given little patentable weight. In re Hutchison, 69 USPQ 138.)

With respect to the Applicants' remarks to claim 16 regarding 1) and 2) (See pages 20 and 37 of the present remarks) the Examiner directs the Applicant's to the remarks above. Regarding 3) that, "Khrustalev does not disclose the condenser 36 is positioned between a first and second module compartment", the Examiner respectfully notes that the Examiner has detailed the compartments as being between each air-to-fluid heat exchanger (30 - See

Khrustalev Fig 1) and therefore the heat exchanger (30) must inherently be between the compartments.

Claims 2, 3 and 4 depend from independent claim 1. For at least the reasons discussed above with respect to claim 1, claims 2, 3 and 4 are likewise patentable over Khrustalev.

With respect to independent claim 16, while Assignee does not accede to the stated rejection of claim 16 as presented before this amendment, Assignee has chosen to amend claim 16, without prejudice, to place it and its dependents in better condition for allowance or appeal. Claim 16 now explicitly requires:

a chassis;

an air mover coupled to the chassis to induce a flow of air along a flow path within the chassis;

a first computer module compartment positioned in the **air flow path within the** chassis ~~and in an air flow path to which so that~~ heat from the first compartment is transferred **to the air flow;** and

an air-to-fluid heat exchanger positioned at least proximate to the first computer module compartment and in the air flow path ~~and adapted to remove a portion of the heat therefrom~~, the heat exchanger including at least one internal fluid passage configured to carry a working fluid having a boiling point in the heat exchanger between about 45° F. and about 75° F **to thereby remove a portion of the heat from the air flow.**

For at least the reasons set forth above with respect to claim 1, claim 16 and its dependents are patentable over Khrustalev. Reconsideration and withdrawal of this rejection is requested.

With respect to claim 5, Khrustalev et al. further teaches that the heat exchanger (30) includes at least one opening through which air can pass from at least proximate the first computer module compartment to at least proximate the second computer module compartment (See Fig 2).

With respect to claims 6 and 29, Khrustalev et al. further teaches that the heat exchanger (30) is positioned at least partially between the first and second computer module compartments in the chassis (See Figs 1 and 3, see also paragraph 35).

With respect to claims 7, 8, and 9, Khrustalev et al. further teaches that the heat exchanger (30) is a first heat exchanger, and wherein the computer system further comprises: a third computer module compartment (Between two of the heat exchangers (30) see Fig 1) positioned in the chassis and in the air flow path (See Fig 1); and a second heat exchanger (30, see paragraph 36) positioned in the chassis and in the air flow path (See Fig 1), wherein the second heat exchanger is positioned at least partially downstream of the second computer module compartment and at least partially upstream of the third computer module compartment (See Fig 1), wherein the first, second and third computer module compartments, and the first and second heat exchangers, are arranged vertically in the chassis (See Fig 1).

With respect to claims 10, 11, and 17, Khrustalev et al. further teaches that the first computer module compartment (Between respective heat exchangers (30)) is configured to hold at least a first computer module (or a plurality thereof) oriented edgewise with respect to the air flow path (See Fig 1).

With respect to claim 12, Khrustalev et al. further teaches that the first computer module compartment is configured to hold at least a first computer module oriented edgewise with respect to the air flow path toward a first side of the heat exchanger (See Fig 1), and wherein the second computer module compartment is configured to hold at least a second computer module oriented edgewise with respect to the air flow path toward a second side of the heat exchanger opposite to the first side of the heat exchanger (See Fig 1).

With respect to claim 13, Khrustalev et al. further teaches a first computer module (9) carried by the first computer module compartment (See Fig 3), wherein the first computer module includes at least a first computer processor (7, see paragraph 2, "IC"), and a second computer module (9) carried by the second computer module compartment, wherein the second computer module includes at least a second computer processor (7, see paragraph 36).

With respect to claim 18, Khrustalev et al. further teaches that the first computer module compartment is positioned at least proximate to a first side of the heat exchanger (See Fig 1), and wherein the chassis further includes a second computer module compartment (Between a second set of 30) positioned in the air flow path in the chassis at least proximate to a second side of the heat exchanger opposite to the first side of the heat exchanger (See Fig 1).

With respect to claim 19, Khrustalev et al. further teaches that the heat exchanger (30) is a first heat exchanger, and wherein the computer system

further comprises: a third computer module compartment positioned in the air flow path (See Fig 1) in the chassis (10), and a second heat exchanger (30) positioned at least partially between the second and third computer module compartments (See Fig 1) in the air flow path in the chassis, the second heat exchanger including at least one internal fluid passage configured to carry a working fluid having a boiling point in the second heat exchanger between about 45F and about 75F (See paragraph 39).

With respect to claims 21 and 22, Khrustalev et al. further teaches that the working fluid is carried by the internal fluid passage of the heat exchanger (See Paragraph 39) and wherein a first portion of the working fluid is in a liquid state and a second portion of the working fluid is in a gaseous state in the heat exchanger (The working fluid will be both in a liquid and gaseous state in the heat exchanger since the heat from the board (9) is causing the fluid to change phases).

With respect to claim 23, Khrustalev et al. further teaches that the working fluid is a refrigerant (Paragraph 39, "Freon").

With respect to claim 25, Khrustalev et al. further teaches that the heat exchanger (30) is positioned upstream of the first computer module compartment in the chassis (See Fig 1).

With respect to claim 28, Khrustalev et al. further teaches a plurality of computer modules (7) held in the first computer module compartment (See Fig 3).

With respect to claim 30, Khrustalev et al. further teaches that the second heat exchanger (30) is spaced apart from the chassis (See Fig 1).

With respect to claim 32, Khrustalev et al. further teaches that the first computer module compartment is configured to hold a plurality of computer modules (7) oriented edgewise with respect to the air flow path (See Fig 3).

Claims 5 – 13 depend from independent claim 1. For at least the reasons discussed above with respect to claim 1, claims 5 – 13 are likewise patentable over Khrustalev. Reconsideration and withdrawal of these rejections is earnestly requested. None of claims 5 – 13 have been amended in response to these rejections.

Claims 17 – 19, 21 - 23 and 25 depend from independent claim 16. For at least the reasons discussed above with respect to claim 16, claims 17 – 19, 21 - 23 and 25 are likewise patentable over Khrustalev. Reconsideration and withdrawal of these rejections is earnestly

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requested. None of claims 17 – 19, 21 - 23 and 25 have been amended in response to these rejections.

Claims 28 – 30 and 32 depend from independent claim 26. For at least the reasons discussed above with respect to claim 26, claims 28 - 30 and 32 are likewise patentable over Khrustalev. Reconsideration and withdrawal of these rejections is earnestly requested. None of claims 28 - 30 and 32 have been amended in response to these rejections.

4. Claims 14, 15, 20, 33-34, 36-49, 51, 53, 54-57, 59-61 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khrustalev et al. in view of Benavides (US 6,185,098).

With respect to claims 14, 15, 20, Khrustalev et al. teaches the limitations of claim 1 above, and further teaches airflow, but is silent as to utilizing an air mover carried by the chassis and configured to move air past the heat exchanger along the air flow path in the chassis. Benavides teaches an air mover (203/208) carried by a chassis (101) and configured to move air past the heat exchanger along an air flow path in a chassis. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Benavides with that of Khrustalev et al. to provide additional ventilation (Benavides: Column 12, Lines 59-61).

8. With respect to the Applicants' remarks to claims 14, 15, and 20 that, "Benavides does not disclose or teach using heat exchangers in the cabinets positioned in an air flow path [or that] the air movement with the cabinet is through servers around the servers or some other path", the Examiner respectfully notes that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the present case Benavides is not required to teach the aforementioned limitations.

With respect to the Applicants' remarks to claims 14, 15, and 20 that, "The office has pointed to no teaching, suggestions or motivation to combine the forced-air, noncooling system of Benavides with the physical contact system of Khrustalev", the Examiner respectfully disagrees and directs applicant to the office action dated 6/13/2006 page 8 which recites, "It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Benavides with that of Khrustalev et al. to provide additional ventilation (Benavides: Column 12, Lines 59-61)".

Assignee respectfully disagrees that the Office has made out a *prima facie* case for

combining the disclosures of Khrustalev and Benavides. It is incumbent upon the Office to present a showing of a motivation, teaching, or suggestion to combine the disclosures of Khrustalev and Benavides. *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991); MPEP § 706.02(j). The Office's cited evidence of a motivation, teaching, or suggestion is a statement in Benavides that

For applications in which additional ventilation is desired, a top fan assembly 203 may be mounted on the top of the cabinet 101.

However, it is indisputable that Benavides is *not* directed to a system using a fluid heat exchanger, such as Khrustalev's rail evaporator 30. Indeed, Benavides does not mention, "heat exchanger," "evaporator," "condenser" or any similar term. Further, as argued above, Khrustalev has absolutely no mention or discussion of the desirability of using forced air flow with its rail evaporator. Thus, Assignee again requests that the Office either withdraw this rejection over the improper combination of Khrustalev and Benavides, or provide a cogent statement as to why a person of ordinary skill in the art would be motivated to combine the disclosures of those two disparate references.

Further, even if such combination were proper under controlling precedent, the resulting combination would not disclose each claim limitation of claims 14, 15 and 20, as argued previously.

Lastly, claims 14, 15 and 20 depend from claims 1 and 16. For at least the reasons presented above for claims 1 and 16, claims 14, 15 and 20 are patentable over Khrustalev, Benavides and their combination. Note, however, that because of the amendments made to

claim 1, claims 14 and 15 have been canceled. No amendment to claim 20 has been made in response to these rejections. Reconsideration and withdrawal are respectfully requested.

With respect to claim 33, Khrustalev et al. further teaches a computer system comprising, a chassis (10), a flow path through at least a portion of the chassis, a first computer module compartment (Between respective heat exchangers (30)) positioned in an air flow path in the chassis, a first plurality of computer modules (7) held in the first computer module compartment; a second computer module compartment (Between respective heat exchangers 30) positioned in an air flow path in the chassis and spaced apart from the first computer module compartment (See Fig 1, see also Paragraphs 35-37), a second plurality of computer modules (7) held in the second computer module compartment at least partially in the air flow path; and a heat exchanger (30 – where the liquid within the exchanger absorbs heat from the air that passes through it) positioned in the air flow path in the chassis (See Fig 1), wherein the heat exchanger is positioned at least partially downstream of the first computer module compartment and at least partially upstream of the second computer module compartment (See Fig 1), and wherein the heat exchanger includes at least one opening through which the air mover moves air (See Fig 2 adjacent the arrows of the element number 31) through which the air mover moves air to transfer heat thereto (where as the moved air collects heat from the modules it will release that heat to the fluid within the heat exchanger 30). Khrustalev et al. is silent as to an air mover positioned in flow communication with the chassis, wherein the air mover is configured to move air along a flow path. Benavides teaches an air mover (203/208) configured to move air past the heat exchanger along an air flow path in a chassis. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Benavides with that of Khrustalev et al. to provide additional ventilation (Benavides: Column 12, Lines 59-61).

With respect to the Applicants' remarks to claim 33, the Examiner respectfully directs the Applicant's to the response to arguments above.

With respect to independent claim 33, while Assignee does not accede to the stated rejection of claim 33 as presented before this amendment, Assignee has chosen to amend claim 33, without prejudice, to place it and its dependents in better condition for allowance or appeal. Claim 33 now explicitly requires:

a chassis **having an air inlet and an air outlet;**

an air mover positioned in flow communication with the chassis, wherein the air mover is

configured to move air along a **forced air** flow path through at least a portion of the chassis;

a first computer module compartment positioned in the air flow path in the chassis;

a first plurality of computer modules held in the first computer module compartment at least partially in the air flow path;

a second computer module compartment positioned in the air flow path in the chassis and spaced apart from the first computer module compartment;

a second plurality of computer modules held in the second computer module compartment at least partially in the air flow path; and

an air-to-fluid heat exchanger positioned in the air flow path in the chassis, wherein the heat exchanger is positioned at least partially downstream of the first computer module compartment and at least partially upstream of the second computer module compartment, and wherein the heat exchanger includes at least one opening through which the air mover moves air to transfer heat ~~thereto~~ **from the air to the fluid.**

For at least the reasons argued above with respect to claim, 1, Khrustalev cannot anticipate independent claim 33. For at least the reasons presented above for claim 20, it is improper to combine Khrustalev and Benavides, and even if such combination were permissible, the resulting combination would not disclose each claim limitation of claim 33.

Reconsideration and withdrawal of this rejection is requested.

With respect to claim 34, Benavides further teaches that the air mover (203/208) is positioned toward an upper portion of the chassis and configured to draw air upward through the chassis such that air would draw past the first computer module compartment, the heat exchanger, and the second computer module compartment of Khrustalev et al.

With respect to claim 36, Benavides further teaches that the air mover is carried by the chassis (See Fig 2).

With respect to claim 37, Khrustalev et al. further teaches that the heat exchanger is a first heat exchanger, and wherein the computer system further comprises: a third computer module compartment (See Fig 1, see also Paragraph 36) positioned in the air flow path in the chassis and spaced apart from the second computer module compartment; a third plurality of computer modules (7) held in the third computer module compartment (See Paragraph 36) at least partially in the air flow path; and a second heat exchanger (30) positioned in the air flow path in the chassis, wherein the second heat exchanger is positioned at least partially downstream of the second computer module compartment and at least partially upstream of the third computer module compartment (See Fig 1), and wherein the heat exchanger includes at least one opening through which the air mover moves air (See Fig 2).

With respect to claim 38, Khrustalev et al. further teaches that the first computer module compartment, the second computer module compartment, and the heat exchanger are arranged vertically with respect to the chassis (See Figs 1 and 2).

With respect to claim 39, Khrustalev et al. further teaches that the first computer module compartment is configured to hold at least a first computer module oriented edgewise with respect to the air flow path toward a first side of the heat exchanger (See Fig 1), and wherein the second computer module compartment is configured to hold at least a second computer module oriented edgewise with respect to the air flow path toward a second side of the heat exchanger opposite to the first side of the heat exchanger (See Fig 1).

With respect to claim 40, Khrustalev et al. further teaches that the first plurality of computer modules (7) is individually carried by the first computer module compartment (As illustrated in Fig 3 for example), wherein each of the first plurality of computer modules includes at least a first computer processor (See Paragraph 2, "IC"), wherein each of the second plurality of computer modules (7) is individually carried by the second computer module compartment (Again as illustrated in Fig 3 for example), and wherein each of the second plurality of computer modules includes at least a second computer processor (See paragraph 2, "IC").

With respect to claim 41, Khrustalev et al. further teaches that the heat exchanger (30) includes at least one internal fluid passage configured to carry a working fluid (See Paragraph 39).

With respect to claim 42, Khrustalev et al. further teaches that the heat exchanger (30) includes at least one internal fluid passage configured to carry a working fluid having a boiling point in the heat exchanger between about 45F and about 75F (See Paragraph 39. Additionally the Examiner notes that the language "configured to" or "adapted to" is not a positive limitation but only requires the ability to so perform, and therefore is given little patentable weight. In re Hutchison, 69 USPQ 138.)

With respect to claim 43, Khrustalev et al. further teaches that each computer module (7) of the first and second pluralities of computer modules includes at

least one processor (See paragraph 2, "IC").

Claims 34 and 36 - 43 depend from independent claim 33. For at least the reasons discussed above with respect to claim 33, claims 34 and 36 - 43 are likewise patentable over Khrustalev in view of Benavides. None of claims 34 and 36 - 43 has been amended in response to these rejections. Reconsideration and withdrawal of these rejections is earnestly requested.

With respect to method claims 44-49, 51, 54 the method steps recited in the claims are inherently necessitated by the device structure as taught by the Khrustalev et al. and Benavides references.

With respect to the Applicants' remarks to claims 44-49, 51, and 54 that, "Khrustalev's invention specifically does not rely on forced air movement within the cabinet", the Examiner respectfully notes that because Khrustalev's invention does not rely on forced air does not preclude the 'invention from actually having moving air either forced or by convection to help cool the modules. That is to say, while Khrustalev's invention does not specifically teach moving or forced air, the invention would inherently have moving air through natural convection and the invention could be outfitted with air moving means (I.E. a fan) to further increase heat transfer between the modules and the air, and between the air and the fluid within the heat exchangers. With respect to the newly added limitation, "air-to-fluid" the Examiner respectfully directs the Applicant's to the remarks above.

With respect to Applicants' remarks to [claim 54], the Applicant's are directed to the response to arguments above.

While Assignee does not accede to the stated rejection of claims 44 and 51, as presented before this amendment, Assignee has chosen to amend claim 44 and 51, without prejudice, to place them and their dependents in better condition for allowance or appeal. Claim 44 now explicitly requires:

moving a portion of forcing air past the first computer module in the chassis to transfer heat from the first computer module to the **portion of air**;
after **moving forcing** the **portion of** air past the first computer module, moving **the at least a**

portion of ~~the~~ air through an air-to-fluid heat exchanger in the chassis to transfer heat from the portion of air to the fluid in the heat exchanger; and
after moving the portion of air past the heat exchanger, moving ~~the portion of~~ air past the second computer module in the chassis to transfer heat from the second computer module to ~~the a~~ portion of air.

Claim 51 now requires:

placing an air-to-fluid heat exchanger in the chassis;
~~moving a portion of forcing~~ air past the computer module in the chassis to transfer heat from the computer module to the ~~portion of~~ air;
moving a working fluid through an internal passage of ~~an~~ the air-to-fluid heat exchanger ~~positioned in the chassis; and~~
~~moving the portion of air through the heat exchanger to transfer~~ transferring heat from ~~the at least a~~ portion of the heated air to the heat exchanger; and
~~boil~~ boiling at least a portion of the working fluid in the internal passage.

For at least the reasons presented above with respect to claim 1 and claim 20, claims 44 and 51 are patentable over Khurstalev and Benavides.

Claims 45-49 and 54 depend from independent claims 44 and 51, respectively. For at least the reasons discussed above with respect to claims 44 and 51, claims 45-49 and 54 are likewise patentable over Khurstalev in view of Benavides. None of claims 45-49 and 54 has been amended in response to these rejections. Reconsideration and withdrawal of these rejections is earnestly requested.

With respect to method claim 53, Khurstalev et al. in view of Benavides teaches the limitations of claim 51 above but is silent as to the working fluid

has a boiling point between about 50F and about 65F, however it would have been obvious to one of ordinary skill in the art at the time the invention was made to setup the system such that the refrigerant has a boiling point in the heat exchanger between about 50F and 65F since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present case having a boiling point between 50F and 65F will provide a suitable degree of cooling to the components therewith.

With respect to method claim 55, Khrustalev et al. in view of Benavides teaches the limitations of claim 51 above and further teaches that the working fluid is a first working fluid, and the heat exchanger (30) is a first heat exchanger having a first internal passage (30, 31, 44), and wherein the method further comprises: after moving the portion of air past the first heat exchanger (30 – See present Office Action Fig 1 below)), moving the portion of air past a second computer module (7) in the chassis to transfer heat from the second computer module (7) to the portion of air; moving a second working fluid (See Paragraph 39) through a second internal passage (30, 31, 44) of a second heat exchanger (30) positioned at least proximate to the second computer module (7) in the chassis (See paragraph 37), and moving the portion of air through the second heat exchanger (30) to transfer heat from the portion of air to the second heat exchanger (30) and boil at least a portion of the second working fluid in the second internal passage (See paragraphs 39-40).

With respect to claim 56, Khrustalev et al. in view of Benavides teaches the limitations of claim 55 above and further teaches moving the first working fluid through the first internal passage (30, 31, 44) includes moving a first portion of a refrigerant received from a refrigerant source (36), and wherein moving a second working fluid through a second internal passage (30, 31, 44) includes moving a second portion of the refrigerant. Khrustalev et al. in view of Benavides is silent as to the second working fluid being received from the refrigerant source, however It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the system of Khrustalev et al. such that all of the sets of passages have a common refrigerant source since doing so would allow flexibility in the system such that if the system as a whole requires more working fluid (refrigerant, I.E. because more of the heat exchangers are being used) the system could draw from common refrigerant source.

With respect to the Applicants' remarks to claims [53, 55-56], the Applicant's are directed to the response to arguments above.

Claims 53 and 55 - 56 depend from independent claim 51. For at least the reasons discussed above with respect to claim 51, claims 53 and 55 - 56 are likewise patentable over Khrustalev in view of Benavides. None of claims 53 and 55 - 56 has been amended in response

to these rejections. Reconsideration and withdrawal of these rejections is earnestly requested.

With respect to claim 57, Khrustalev et al. teaches a method for dissipating heat generated by a computer module (7) in a chassis (10), the method comprising: moving a working fluid (See Paragraph 39) through an internal passage (30, 31, 44) of a heat exchanger (30) positioned in the chassis (10), moving a portion of air past the heat exchanger (30) to transfer heat from the portion of air to the working fluid, and controlling the working fluid (Via piping 30, 31, 44, and wick 64) to maintain the working fluid at least proximate to the phase transition state while flowing through the internal passage (See paragraphs 39-40). Khrustalev et al. is silent as to moving a portion of air past the computer module in the chassis to transfer heat from the computer module to the portion of air. Benavides teaches moving a portion of air past a computer module in a chassis to transfer heat from the computer module to the portion of air (Via 207, 208, see Fig 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Benavides with that of Khrustalev et al. to provide additional ventilation (Benavides: Column 12, Lines 59-61).

With respect to the Applicants' remarks to [claim 57], the Applicant's are directed to the response to arguments above.

While Assignee does not accede to the stated rejection of claim 57, as presented before this amendment, Assignee has chosen to amend claim 57, without prejudice, to place it and its dependents in better condition for allowance or appeal. Claim 57 now explicitly requires:

placing an air-to-fluid heat exchanger in the chassis;

moving a portion of forcing air past the computer module in the chassis to transfer heat from the computer module to the **portion of air;**

moving a working fluid through an internal passage of **a the** heat exchanger **positioned in the chassis;**

moving **at least a** the portion of **the heated** air through the heat exchanger to transfer heat from the portion of air to the working fluid; and

controlling the working fluid to maintain the working fluid at least proximate to the phase transition state while flowing through the internal passage

For at least the reasons presented above with respect to claim 1 and claim 20, claim 57 is patentable over Khurstalev and Benavides.

With respect to claim 59, Khurstalev et al. in view of Benavides teaches the limitations of claim 57 but is silent as to the working fluid, wherein the working fluid is a refrigerant having a boiling point in the heat exchanger between about 50F and about 65F, however it would have been obvious to one of ordinary skill in the art at the time the invention was made to setup the system such that the refrigerant has a boiling point in the heat exchanger between about 50F and 65F since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present case having a boiling point between 50F and 65F will provide a suitable degree of cooling to the components therewith.

With respect to claim 60, Khurstalev et al. further teaches that the computer module (7) is a first computer module, and wherein the method further comprises, after moving the portion of air past the heat exchanger (30), moving the portion of air past a second computer module (7) in the chassis (10) to transfer heat from the second computer module (7) to the portion of air (That is, as air blows upward in the chassis of Khurstalev, it will pickup heat from the first lower module (7) and blow past the second higher heat exchanger (30) which supports a second computer module (7) and will further blow air past the second module).

With respect to claim 61, Khurstalev et al. further teaches that controlling the working fluid to maintain the working fluid at least proximate to the phase transition state includes controlling the pressure of the working fluid (The sizing of the pipes controls the pressure of the working fluid within).

With respect to Applicants' remarks to [claim 59], the Applicant's are directed to the response to arguments above.

Claims 59 - 61 depend from independent claim 57. For at least the reasons discussed above with respect to claim 57, claims 59 - 61 are likewise patentable over Khurstalev in view of Benavides. None of claims 59 - 61 have been amended in response to these rejections. Reconsideration and withdrawal of these rejections is earnestly requested.

3. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Khurstalev et al.

With respect to claim 24, Khrustalev et al. teaches the limitations of claim 16 but is silent as to the working fluid, wherein the working fluid is a refrigerant having a boiling point in the heat exchanger between about 50F and about 65F, however it would have been obvious to one of ordinary skill in the art at the time the invention was made to setup the system such that the refrigerant has a boiling point in the heat exchanger between about 50F and 65F since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). In the present case having a boiling point between 50F and 65F will provide a suitable degree of cooling to the components therewith.

With respect to Applicants' remarks to [claim 24], the Applicant's are directed to the response to arguments above.

Claim 24 depends from independent claim 16. For at least the reasons discussed above with respect to claim 16, claim 24 is likewise patentable over Khrustalev. Claim 24 has not been amended in response to this rejection. Reconsideration and withdrawal of these rejections is earnestly requested.

6. Claims 27 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khrustalev et al. in view of Salt (US 5,603,375).

With respect to claim 27, Khrustalev et al. teaches the limitations of claim 26 above but is silent as to the working fluid has a boiling point in the first heat exchanger between about 45F and about 75F. Salt teaches utilizing a working fluid which has a boiling point in a heat exchanger of between about 45F and 75F (Column 2, Lines 1-5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Salt with that of Khrustalev et al. to provide adequate heat transfer capabilities.

With respect to Applicants' remarks to [claim 27], the Applicant's are directed to the response to arguments above.

Assignee respectfully traverses these rejections. As discussed above, Khrustalev does not teach or disclose many of claim limitations found in independent claim 26. As argued in its previous response Assignee challenges the propriety of combining Khrustalev and Salt. However, even if such combination were appropriate, the resulting combined structure would not

have all of the recited limitations set forth in claim 27. Moreover, claim 27 is patentable for at least the reasons set forth above with respect to claim 26, from which it depends. No amendment to claim 27 was made in response to this rejection. For at least these reasons, Assignee contends that claim 27 is patentable over Khrustalev, Salt and their combination. Reconsideration and withdrawal is requested.

With respect to claim 58, Khrustalev et al. in view of Benavides teaches the limitations of claim 57 above but is silent as to the working fluid has a boiling point in the first heat exchanger between about 45F and about 75F. Salt teaches utilizing a working fluid which has a boiling point in a heat exchanger of between about 45F and 75F (Column 2, Lines 1-5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Salt with that of Khrustalev et al. and Benavides to provide adequate heat transfer capabilities.

With respect to Applicants' remarks to [claim 58], the Applicant's are directed to the response to arguments above.

Assignee respectfully traverses these rejections. As discussed above, Khrustalev does not teach or disclose many of claim limitations found in independent claim 57. As argued in its previous response Assignee challenges the propriety of combining Khrustalev and Salt. However, even if such combination were appropriate, the resulting combined structure would not have all of the recited limitations set forth in claim 58. Moreover, claim 58 is patentable for at least the reasons set forth above with respect to claim 57, from which it depends. No amendment to claim 58 was made in response to this rejection. For at least these reasons, Assignee contends that claim 58 is patentable over Khrustalev, Salt and their combination. Reconsideration and withdrawal is requested.

5. Claims 50 and 52 are rejected under 35 U.S.C. 103(a) as being unpatentable over Khrustalev et al. in view of Benavides and further in view of Salt.

With respect to method claims 50, 52 Khrustalev et al. in view of Benavides teach the method of claim 44 above, and further teaches moving the portion of air past the heat exchanger includes transferring heat to the working fluid but fails to teach the working fluid having a boiling point between about 45F and about 75F. Salt teaches utilizing a working fluid which has a boiling point in a heat exchanger of between about 45F and 75F (Column 2, Lines 1-5). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Salt with that of Khrustalev et al. to provide adequate heat transfer capabilities.

With respect to the Applicants' remarks to claims 50, and 52 that, "the Office either withdraw this rejection or specifically and explicitly state the motivation or suggestion in the art that authorizes such combination", the Applicant's are directed to the previous office action dated 6/13/2006 page 19 paragraph 7 which recites, in part, "to provide adequate heat transfer capabilities". Further the Examiner directs the Applicant's to Column 1 Line 61 - Column 2 Line 5 which further supports the Examiners explicit motivation for combining the references.

Assignee respectfully traverses these rejections. With respect to the combination of Khrustalev, Benavides and Salt, Assignee challenges the propriety of such triple combination and requests that the Office either withdraw this rejection or specifically and explicitly state the motivation or suggest in the art that authorizes such combination. However, even if such combination were appropriate, the resulting combined structure would not have all of the recited limitations set forth in claims 50 or 52. Moreover, claims 50 and 52 are patentable for at least the reasons set forth above with respect to claims 44 and 51, respectively, from which they depend. No amendment to claims 50 or 52 was made in response to this rejection. For at least these reasons, Assignee contends that claims 50 and 52 are patentable over Khrustalev, Benavides, Salt and their combination. Reconsideration and withdrawal is requested.

8. Claim 31 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

With respect to claim 31, the allowability resides in the overall structure of the device as recited in dependent claim 31 and at least in part because claim 31 recites, "a controller operably coupled to the second heat exchanger to maintain the working fluid in phase transition within the first heat exchanger".

The aforementioned limitations in combination with all remaining limitations of claims 26 and 31 are believed to render said claim 31 patentable over the art of record.

Assignee thanks the Examiner for his efforts on this file and the favorable consideration given to claim 31. However, at this time, Assignee chooses not to re-present claim 31 in favor of the arguments presented above.

CONCLUSION

Claims 1 – 34 and 36 – 61 were pending prior to this response with claims 1 – 30, 32 – 34 and 36 – 61 being rejected, claim 31 being objected to, and claim 35 being withdrawn.

Claims 1, 16, 26, 33, 44, 51 and 57 have been amended herein. Claims 14 and 15 have been canceled. Assignee submits that each claim presented herein is patentable. A timely notice of allowance is respectfully requested.

Assignee thanks the Examiner for his consideration and effort on this file. If there are any questions or if additional information is needed, the Examiner is invited to telephone or email the undersigned.

Appl. No. 10/805,875
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Respectfully submitted,

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